



Foundry Sand Reuse in Rhode Island

Best Practices & Regulatory Compliance

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Table of Contents

1. Rhode Island - Foundry Sand Recycling and Reuse (Cover)
2. Table of Contents
3. Key Concepts and Definitions
4. Regulatory Guidelines
5. Reuse Applications and Rhode Island Examples
6. Environmental and Technical Considerations
7. Funding, Grants, and Incentives
8. Active Participants in Rhode Island
9. Success Story Highlights
10. Clear Business Case Summary
11. Risk Management Overview
12. Step-by-Step Workflow for Foundries
13. Real Cost Savings Example
15. General FAQ & Landfill-Specific FAQ
16. References

3. Key Concepts and Definitions

What is Foundry Sand?

Foundry sand is high-purity silica sand used in the metal casting process to create molds for Rhode Island's specialized industrial base, which includes fine art, high-end jewelry, and precision maritime components. Once the sand can no longer be used internally—due to thermal fatigue or binder saturation—it is removed as **spent foundry sand (SFS)**. In Rhode Island, this material is considered a solid waste unless formally authorized for **Beneficial Use**.

What is Beneficial Reuse?

In Rhode Island, beneficial reuse is the utilization of a solid waste in a manner that provides a documented environmental or economic advantage, serving as a functional substitute for virgin materials. This process is governed by the Rhode Island Department of Environmental Management (RIDEM) to ensure that industrial byproducts are diverted from the state's sole remaining landfill capacity.

What is the TCLP Test?

The **Toxicity Characteristic Leaching Procedure (TCLP)** (EPA Method 1311) is the standard analysis used to verify that a waste is not hazardous. Given Rhode Island's dense population and reliance on coastal aquifers, passing TCLP is the first technical requirement to qualify for a Beneficial Use Determination (BUD) under state rules.

4. Regulatory Guidelines

Rhode Island Dept. of Environmental Management (RIDEM)

RIDEM, specifically the Office of Land Revitalization and Sustainable Materials Management, regulates the reuse of industrial byproducts.

Specific Legal Citations:

- **250-RICR-140-05-1**: "Solid Waste Regulation No. 1." Provides the foundational regulatory framework for all waste disposal and reuse in the state.
- **Section 1.5.11 (250-RICR-140-05-1)**: Outlines the specific requirements for obtaining a **Beneficial Use Determination (BUD)**.
- **Title 23, Chapter 23-18.9**: The state's "Refuse Disposal" statute, which provides the authority for RIDEM to manage and encourage the reuse of industrial materials.

The BUD Process

Rhode Island typically evaluates reuse projects on a case-by-case basis. Generators must provide a detailed chemical and physical characterization to prove that the SFS is inert and suitable for the intended application (e.g., structural fill or aggregate substitute).

5. Reuse Applications and Rhode Island Examples

Application	Description	Rhode Island Context
Road Sub-base	Foundation layer for road construction.	High potential in RIDOT highway and expansion projects.
Landfill Daily Cover	Alternative Daily Cover (ADC).	Critical demand at the Central Landfill (Johnston) .
Concrete/Asphalt Additive	Fine aggregate in paving materials.	Viable for local paving contractors in the Providence area.
Structural Fill	Bedding for building pads or embankments.	Subject to case-specific BUD risk assessment and RIDEM screening.
Controlled Low-Strength Fill	Flowable fill for utility projects.	Demand in Providence and Cranston urban utility upgrades.

6. Environmental and Technical Considerations

Groundwater and Coastal Protection

Due to Rhode Island's small geography and proximity to Narragansett Bay, RIDEM requires rigorous characterization of any material used in un-bound applications. Foundries must ensure SFS meets the state's conservative environmental screening levels to ensure zero risk of metal or binder leaching into coastal ecosystems.

Physical Stability

SFS from Rhode Island's precision art and jewelry foundries often has a very uniform and fine grain size, making it a superior material for specialized "flowable fill" and fine-aggregate concrete products compared to naturally occurring silty Rhode Island soils.

7. Funding, Grants, and Incentives

RIDEM Recycling Assistance

While primarily for local governments, RIDEM supports waste-reduction initiatives that benefit the state's "Circular Economy" goals. Foundries developing regional "Recycled Aggregate Hubs" may qualify for technical support and recognition.

Rhode Island Commerce Corp

The state offers various tax incentives (e.g., the **Rebuild Rhode Island Tax Credit**) for projects that support industrial manufacturing and sustainability. Foundries installing sand reclamation systems may qualify for regional development incentives that support capital investment.

8. Active Participants in Rhode Island

Major Foundries and Hubs:

- **Vinnetti's Bronze Foundry** (Providence) - Full-service art and monument bronze casting.
- **Natale & Sons Casting** (Cranston) - Specialized centrifugal casting for promotional and fashion products.
- **Fielding Mfg.** (Cranston) - Precision miniature zinc die casting for engineered components.
- **Replicast Inc.** (Providence) - Specialized casting for restoration, prototypes, and art.
- **Frank Morrow Company** (Providence) - Decorative metal trims and grey iron motif castings.

Potential End-Users:

- **RIDOT (Rhode Island Dept. of Transportation)** - Major consumer of recycled aggregate for infrastructure.
- **RIRRC (Rhode Island Resource Recovery Corp)** - Major user of ADC at the Central Landfill.
- **Lynch Corp.** (Regional) - Large-scale paving and civil contractor.
- **Cardi Corporation** (Regional) - Significant infrastructure and aggregate user.

9. Success Story Highlights

Providence Art-Aggregate Synergy: Precision foundries in the Providence-Cranston corridor, such as those specializing in fine art and engineered components, have successfully established diversion programs for their spent molding sand. By securing a Beneficial Use Determination (BUD) under 250-RICR-140-05-1, these facilities provide a localized aggregate source for municipal "flowable fill" and structural infrastructure projects. This strategy avoids the high gate fees (which can exceed **\$115.00 per ton**) at the Central Landfill and bypasses associated host community surcharges, while directly supporting Rhode Island's strategic goal of conserving remaining landfill capacity for municipal waste and enhancing the regional industrial circular economy.

10. Clear Business Case Summary

1. **Avoidance of Gate Fees:** Directly saving up to **\$115.00 per ton** (RIRRC Commercial Gate rate).
2. **Exemption from Surcharges:** Bypassing the **\$6.00/ton** host community and fuel surcharges applied to commercial loads.
3. **Logistics Dominance:** Utilizing sand in local Providence-area construction rather than hauling to Johnston, especially as traffic surcharges in the state increase.

11. Risk Management Overview

- **Stockpile Performance Standards:** Foundries must ensure that SFS is stored in a manner that prevents wind-blown dispersal (dust management) to satisfy RIDEM air quality and nuisance standards.
- **BUD Reporting Compliance:** Failure to maintain accurate tonnage records and report to RIDEM (as required by the specific BUD) can result in the revocation of the reuse status.

12. Step-by-Step Workflow for Foundries

1. **Analytical Profiling:** Conduct a full 32-parameter chemical profile, including TCLP and totals.
2. **BUD Application:** Prepare and submit the formal application per **250-RICR-140-05-1**.
3. **Pre-Application Meeting:** Consult with the RIDEM Office of Land Revitalization to review the project scope.
4. **End-User Partnership:** Secure an intake agreement with a local concrete or asphalt plant.
5. **Implementation:** Maintain daily tonnage records and annual characterization updates for state environmental audits.

13. Real Cost Savings Example

Scenario: A Cranston-area manufacturer generating 1,000 tons of sand annually.

- **Disposal Cost (at \$121.00/ton incl. surcharges):** \$121,000
- **Reuse Program (BUD Filing + Testing + Local Logistics):** \$35,000
- **Annual Savings:** \$86,000

15. General FAQ & Landfill-Specific FAQ

Q: Does Rhode Island have "pre-approved" beneficial uses?

A: No, RIDEM typically requires a material-specific and site-specific BUD to ensure the unique binder chemistry of the sand is safe for the intended application.

Q: Are commercial surcharges always applied at the Central Landfill?

A: Yes, for non-contract commercial loads, the **\$3.00/ton fuel surcharge** and **\$3.00/vehicle host community surcharge** are standard.

16. References

1. **250-RICR-140-05-1:** Rhode Island Solid Waste Management Regulations.
2. **RIDEM:** Guidelines on Beneficial Use Determinations (BUD).
3. **RIRRC:** Central Landfill FY 2026 Fee Schedule and Agreements.
4. **Rhode Island General Laws Title 23, Chapter 23-18.9:** Refuse Disposal Statute.
5. **Town of Johnston:** Host Community Commercial Vehicle Surcharge Ordinance.
6. **EPA SMM Technical Guidance:** Foundry Sand in Transportation Applications.